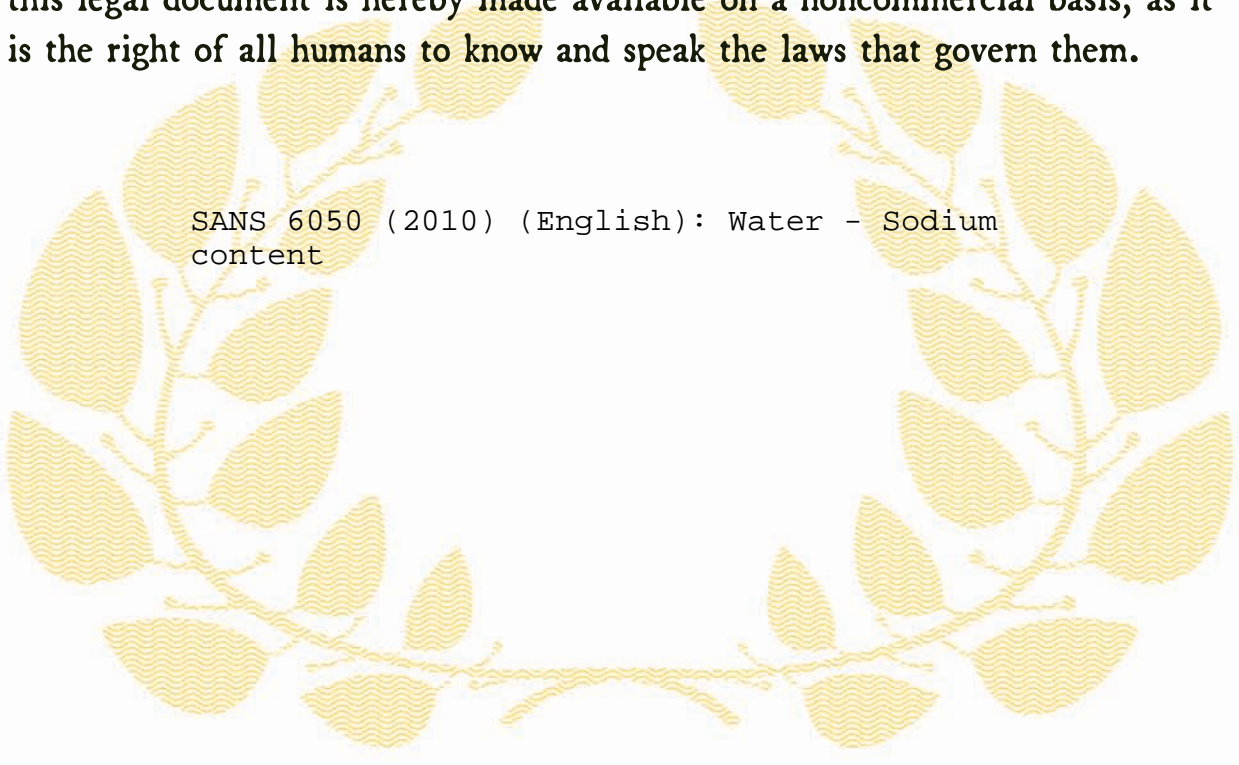




Republic of South Africa

EDICT OF GOVERNMENT

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SANS 6050 (2010) (English): Water - Sodium
content



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SOUTH AFRICAN NATIONAL STANDARD

Water — Sodium content

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Table of changes

Change No.	Date	Scope
Amdt 1	2004	Amended to change the designation of SABS standards to SANS standards and to update referenced standards.
Amdt 2	2010	Amended to update referenced standards.

Foreword

This South African standard was approved by National Committee SABS SC 147A, *Water – Water sampling and analysis*, in accordance with procedures of the SABS Standards Division, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in April 2010.

This document supersedes SANS 6050:2004 (edition 2.1).

A vertical line in the margin shows where the text has been technically modified by amendment No. 2.

Water — Sodium content

1 Scope and field of application

This standard specifies a method of determining the sodium content of water and wastewater by direct flame emission photometry.

The method is applicable to the determination of sodium in the concentration range 1 mg/L to 50 mg/L.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. Information on currently valid national and international standards can be obtained from the SABS Standards Division. **Amdt 1**

SANS 111/ISO 835, *Laboratory glassware – Graduated pipettes.* **Amdt 1; amdt 2 |**

SANS 112/ISO 648, *Laboratory glassware – Single volume pipettes.* **Amdt 1**

SANS 115/ISO 385, *Laboratory glassware – Burettes.* **Amdt 1; amdt 2 |**

SANS 128/ISO 1042, *Laboratory glassware – One-mark volumetric flasks.* **Amdt 1**

SANS 3696/ISO 3696, *Water for analytical laboratory use – Specification and test methods.*

SANS 5213, *Water – Dissolved solids content.*

3 Principle

The sample is aspirated into an air-acetylene flame and the resultant emission intensity measured at 589,0 nm is compared with the emission intensities of bracketing sodium standards measured at the same wavelength.

Self-absorption, as a result of absorption by ground state atoms in the flame, causes a decrease in the emitted radiation as the analyte concentration is increased. This is reflected in a non-linear calibration curve. The precision and accuracy of the method therefore relies heavily on the use of several bracketing standards in order to minimize the effect of non-linearity.

4 Reagents

NOTE Unless otherwise specified, only use water that complies with the requirements of SANS 3696 and reagents of analytical reagent grade.

4.1 Nitric acid (HNO₃)

Concentrated (d at 25°/25 °C = 1,42).

4.2 Acidified water

Containing 1,5 mL of HNO₃ (see 4.1) per litre.

4.3 Sodium stock solution (1 000 mg/L)

4.3.1 Obtain a commercially available stock solution of sodium (1 000 mg/L) of guaranteed quality, or prepare the stock solution as described in 4.3.2.

4.3.2 Dissolve 2,542 g of sodium chloride (NaCl), previously dried at 105 °C and cooled in a desiccator, in 200 mL of water. Dilute with the acidified water (see 4.2) to 1 000 mL in a volumetric flask.

4.4 Sodium standard solution (1 mg/L to 50 mg/L)

Prepare a series of sodium standards that will bracket the sample sodium concentration within the range 1 mg/L to 50 mg/L at intervals of at least 5 mg/L, by dilution of the sodium stock solution (see 4.3) with water.

5 Apparatus

5.1 Spectrophotometer/photometer

5.1.1 Atomic absorption spectrophotometer, in the emission mode, or

5.1.2 Flame photometer, equipped with an appropriate interference filter.

5.2 Air-acetylene burner

Suitable for attachment to the spectrophotometer in 5.1.1.

5.3 Oxidant

Air, dried and filtered.

5.4 Fuel

Acetylene, standard commercial grade. (Replace the cylinder when the cylinder pressure drops to 700 kPa.)

CAUTION: Never allow the operating pressure of acetylene to exceed 105 kPa.

5.5 Pressure-reducing regulators

For the supply of fuel and oxidant to the instrument at the appropriate levels recommended by the manufacturer.

5.6 Glassware

Where applicable, only use burettes, pipettes and volumetric flasks that comply with the requirements for class A items as specified in SANS 111, SANS 112, SANS 115 and SANS 128, as relevant.

Amdt 1; amdt 2

6 Sample pretreatment

Pretreat the sample to remove suspended solids, if necessary, by filtering through a glass fibre filter as described in SANS 5213. No further pretreatment is required.

7 Procedure

7.1 Instrument operation

7.1.1 The differences between makes and models of atomic absorption spectrophotometers and flame photometers make it impracticable to formulate detailed operating instructions. Set the instrument up for emission measurements at 589,0 nm, using the manufacturer's instructions for optimization of the emission signal.

7.1.2 When using an atomic absorption spectrophotometer in the emission mode, it is necessary to so rotate the burner that the emission intensities within the working range of 1 mg/L to 50 mg/L are measurable.

7.2 Instrument calibration

7.2.1 Aspirate a blank (water) and zero the instrument.

7.2.2 Aspirate each of the standard solutions (see 4.4), using the acidified water (see 4.2) to flush the nebulizer between aspirations, and record the respective emission intensities.

7.2.3 Construct a calibration curve, using the standard concentrations and the respective emission intensities.

7.3 Sample analysis

7.3.1 Aspirate the sample, using the acidified water (see 4.2) to flush the nebulizer between aspirations.

7.3.2 Record the emission intensity and determine the sample concentrations by referring to the calibration curve as constructed in 7.2.3, or record the concentrations directly if an instrument with concentration mode is used.

8 Expression of results

Express the result as 'Sodium as Na in mg/L'.

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